KP6-LA

A Pentium® II Processor based AGP mainboard

Manual Revision 1.5
September 9, 1997

Technical Support Services

If you need additional information, help during installation or normal use of this product, please contact your retailer. If your retailer can not help, you may E-Mail us with any questions at the following address tech@epox.com.

Record your serial number before installing your KP6-LA mainboard. (the serial number is located near the ISA slots at the edge of the board)

EPoX KP6-LA serial number:

_____

BIOS Upgrades

Please use either our Web Site or BBS for current BIOS Upgrades.

Internet Access

http://www.epox.com
sales@epox.com
tech@epox.com

Modem Access

886-2-218-0997 (Taiwan)
31-182-618451 (The Netherlands)

You can access this number via a Hayes-compatible modem with a 2,400 to 28,800 baud rate. The following setup format is required:

8 Data Bits, No Parity, 1 Stop Bit.

If your modem is unable to connect at higher baud rates, try connecting at 2,400 baud before contacting Technical Support.

Thank you for using EPoX mainboards!

User Notice

EPoX provides this manual "as is" without warranty of any kind, either express or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose. In no event shall EPoX be liable for any loss or profits, loss of business, loss of use or data, interruption of business or for indirect, special incidental, or consequential damages of any kind, even if EPoX has been advised of the possibility of such damages arising from any defect or error in the manual or product. EPoX may review this manual from time to time without notice. For updated BIOS, drivers, or product release information you may visit EPoX's home page at: http://www.epox.com

Products mentioned in this manual are mentioned for identification purposes only. Product names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies.

The product name and revision number are both printed on the mainboard itself.

Handling Procedures

Static electricity can severely damage your equipment. Handle the KP6-LA and any other device in your system with care and avoid unneccessary contact with system components on the mainboard.

Always work on an antistatic surface to avoid possible damage to the motherboard from static discharge.

We assume no responsibility for any damage to the KP6-LA mainboard that results from failure to follow installation instructions or failure to observe safety precautions.

CAUTION

The KP6-LA mainboard is subject to damage by static electricity. Always observe the handling procedures.

Declaration of Conformity

to the standards set by

THE FEDERAL COMMUNICATIONS COMMISSION

for

47CFR, Part 15 Class B Computing Devices

Please be advised that the product described herein has been tested by a duly accredited laboratory and found to comply with the Class B Standards for a computing device set forth by the Federal Communications Commission in 47CFR Part 15.

Operation of this equipment is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept3 any interference received including interference that may cause undesirable operation.

Name of Responsible Party: EPoX International, Inc.

Address: 499 Nibus Street, Suite A

Brea, CA 92621

Phone: (714) 990-8858

Equipment Tested: Motherboard

Trade Name: EPoX

Model Number: KP6-LA

Signature:_____ Date:_____

FC

EC Declaration of Conformity

We, Manufacturer/Importer

EPoX International, Inc.
499 Nibus Street, Suite A
Brea, CA 92621

declare that the product

Motherboard, Model: KP6-LA
is in conformity with
the specifications referenced below
in accordance with 89/336 Directive and 73/23/EEC

EN 55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
EN 50081-1	Generic emission standard
EN 50082-1	Generic immunity standard
prEN 55024-2 EN61000-4-2	Electrostatic discharge requirements "ESD" (IEC 801-2) (IEC 1000-4-2)
prEN 55024-3 EN61000-4-3	Radiated, radio frequency electromagnetic field (IEC 801-3) (IEC 1000-4-3)
prEN 55024-4 EN61000-4-4	Electrical fast transient requirements "Burst" (IEC 801-4) (IEC 1000-4-4)
CE Marking	EC Conformity marking The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 73/23 EEC
IEC 60950	Safety of information technology equipment, including electrical business equipment.

Manufacturer/Importer

Date: .....

Signature: .....

Name: .....

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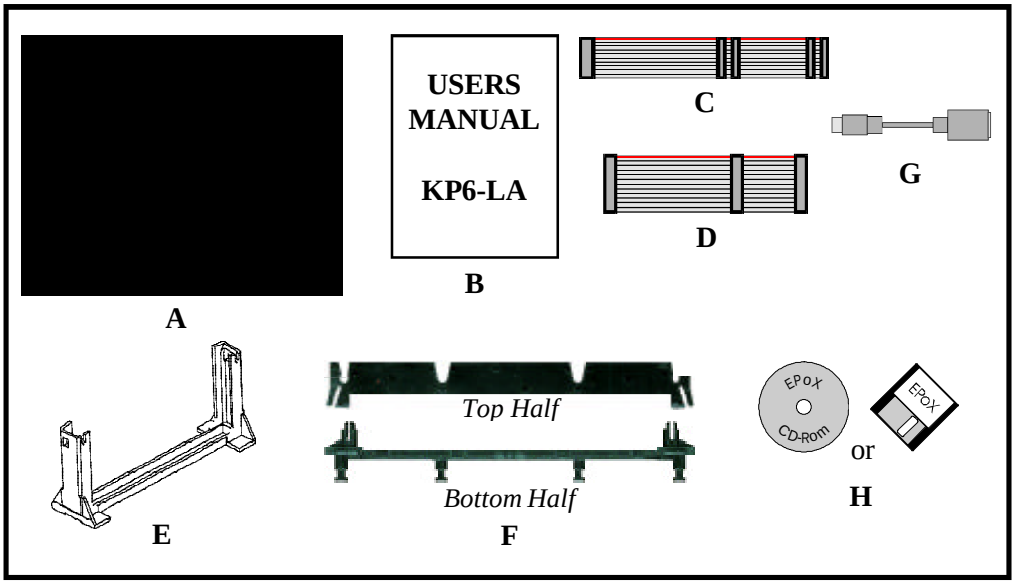

Overview

Pentium II

The Pentium® II Processor is the follow-on to the Pentium® Processor. The Pentium® II Processor, like the Pentium® Pro processor, implements a Dynamic Execution micro-architecture -- a unique combination of multiple branch prediction, data flow analysis, and speculative execution. This enables the Pentium® II Processor to deliver higher performance than the Pentium® processor, while maintaining binary compatibility with all previous Intel architecture processors.

A significant feature of the Pentium® II Processor, from a system perspective, is the built-in direct multiprocessing support. In order to achieve multiprocessing, and maintain the memory and I/O bandwidth to support it, new system designs are needed. For systems with dual processors, it is important to consider the additional power burdens and signal integrity issues of supporting multiple loads on a high speed bus. The Pentium® II Processor card supports both uni-processor and dual processor implementations.

The Pentium® II Processor utilizes Single Edge Contact (S.E.C.) (Figure 1) cartridge packaging technology. The S.E.C. cartridge allows the L2 cache to remain tightly coupled to the processor, while maintaining flexibility when implementing high performance processors into OEM systems. The second level cache is performance optimized and tested at the cartridge level. The S.E.C. cartridge utilizes surface mounted core components and a printed circuit board with an edge finger connection. The S.E.C. cartridge package introduced on the Pentium® II Processor will also be used in future Slot 1 processors.

The S.E.C. cartridge has the following features: a thermal plate, a cover and a PCB with an edge finger connection. The thermal plate allows standardized heatsink attachment or customized thermal solutions. The thermal plate enables a reusable heatsink to minimize fit issues for serviceability, upgradeability and replacement. The full enclosure also protects the surface mount components. The edge finger connection maintains socketabilty for system configuration. The edge finger connector is denoted as ‘Slot 1 connector’ in this and other documentation.

The entire enclosed product is called the Pentium® II Processor. The packaging technology and each of the physical elements of the product are referred to using accurate technical descriptions. This allows clear reference to the products as just a

processor. This is the model used in past packaging technologies like PGA, TCP, PQFP, DIP, etc.

S.E.C. Cartridge Terminology

- Pentium® II Processor
  The new enclosed card packaging technology is called a "Single Edge Contact cartridge." This is similar to previous names for packaging technology such as PGA or TCP.
- Processor card
  The green PCB (with or without components on it)
- Processor core
  The silicon on the PLGA package on the PCB
- Cover
  The plastic cover on the opposite side from the thermal plate.
- Slot 1
  The slot that the S.E.C. cartridge plugs into, just as the Pentium® Pro processor uses Socket 8.
- Retention mechanism
  Formerly 'retention module' the dual posts, etc. that holds the cartridge in place.
- Thermal plate
  The heatsink attachment plate.
- Heat sink supports
  The support pieces that are mounted on the mainboard to provide added support for heatsinks.

The L2 cache (TagRAM, PBSRAM) components keep standard industry names.

The Pentium® II Processor is the first product to utilize the S.E.C. cartridge technology and Slot 1 connector. Unless otherwise noted, any references to "Pentium® II Processor," "Pentium® II Processor/Slot 1 processor" or Processor" will apply to both the Pentium® II Processor desktop processors.

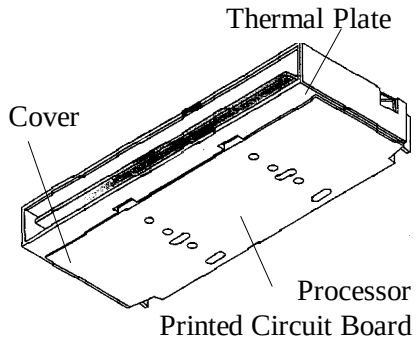

Figure 1: Pentium® II Processor CPU with S.E.C. Cartridge

Accelerated Graphics Port (AGP or A.G.P.)

Typically, 3D graphics rendering requires a tremendous amount of memory, and demands ever increasing throughput speed as well. As 3D products for the personal computer become more and more popular, these demands will only increase. This will cause a rise in costs for both end users and manufacturers. Lowering these costs as well as improving performance is the primary motivation behind AGP. By providing a massive increase in the bandwidth available between the video card and the processor, it will assist in relieving some of these pressures for quite sometime.

Hardware Monitoring

Hardware monitoring allows you to monitor various aspects of your systems operations and status. These include features such as CPU temperature, voltage and fan RPM's.

Desktop Management Interface (DMI)

DMI, or Desktop Management Interface, is a BIOS level method for monitoring specific BIOS related hardware features. It allows the BIOS to collect and store information specific to the system, so that vendors and system integrators will have greater access to information regarding system configuration and design. This allows for better troubleshooting, migration planning, and upgradeability decision making.

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KP6-LA Form-Factor

The EPoX KP6-LA is designed with ATX form factor - the latest industry standard of chassis. The ATX form factor is essentially a Baby-AT baseboard rotated 90 degrees within the chassis enclosure and a new mounting configuration for the power supply. With these changes the processor is relocated away from the expansion slots, allowing them all to hold full length add-in cards. ATX defines a double height aperture to the rear of the chassis which can be used to host a wide range of onboard I/O. Only the size and position of this aperture is defined, allowing PC manufacturers to add new I/O features (e.g.; TV input, TV output, joystick, modem, LAN, audio, etc.) to systems. This will help systems integrators differentiate their products in the marketplace, and better meet your needs.

- By integrating more I/O down onto the board and better positioning the hard drive and floppy connectors material cost of cables and add-in cards is reduced.
- By reducing the number of cables and components in the system, manufacturing time and inventory holding costs are reduced and reliability will increase.
- By using an optimized power supply, it's possible to reduce cooling costs and lower acoustical noise. An ATX power supply, which has a side-mounted fan, allows direct cooling of the processor and add-in cards making a secondary fan or active heatsink unnecessary in most system applications.

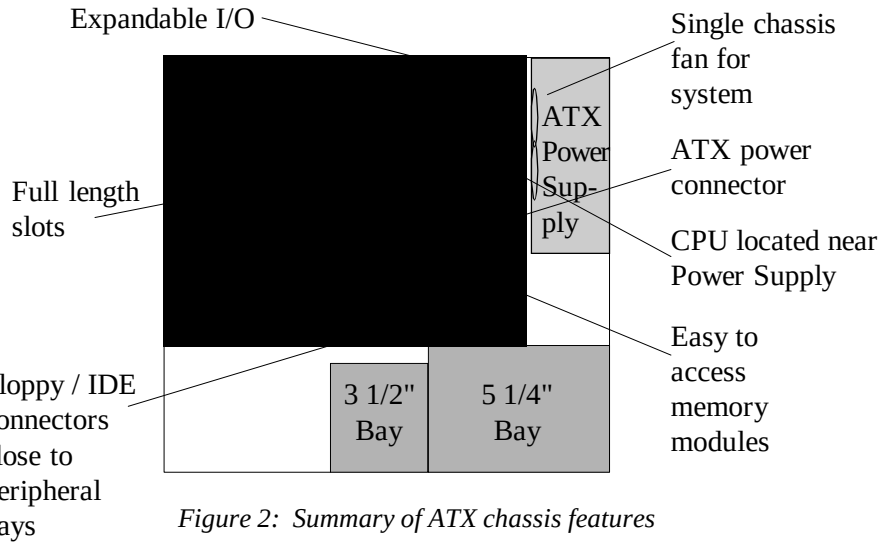


Figure 2: Summary of ATX chassis features

I/O Shield Connector

The KP6-LA is equipped with an I/O back panel. Please use the appropriate I/O shield (figure 3).

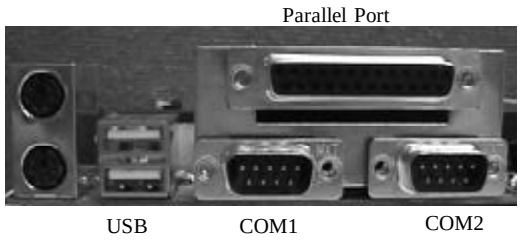


Figure 3: KP6-LA I/O back panel layout

Power-On/Off (Remote)

The KP6-LA has a single 20-pin connector for ATX power supplies. For ATX power supplies that support the **Remote On/Off** feature, this should be connected to the systems front panel for system Power On/Off button. The systems power On/Off button should be a momentary button that is normally open.

The KP6-LA has been designed with “Soft Off" functions. You can turn Off the system from one of two sources: The first is the front panel Power On/Off button, and the other is the "Soft Off" function (coming from the KP6-LA’s onboard circuit controller) that can be controlled by the operating system. Windows 95 will control this when the user clicks that they are ready to Shutdown the system.

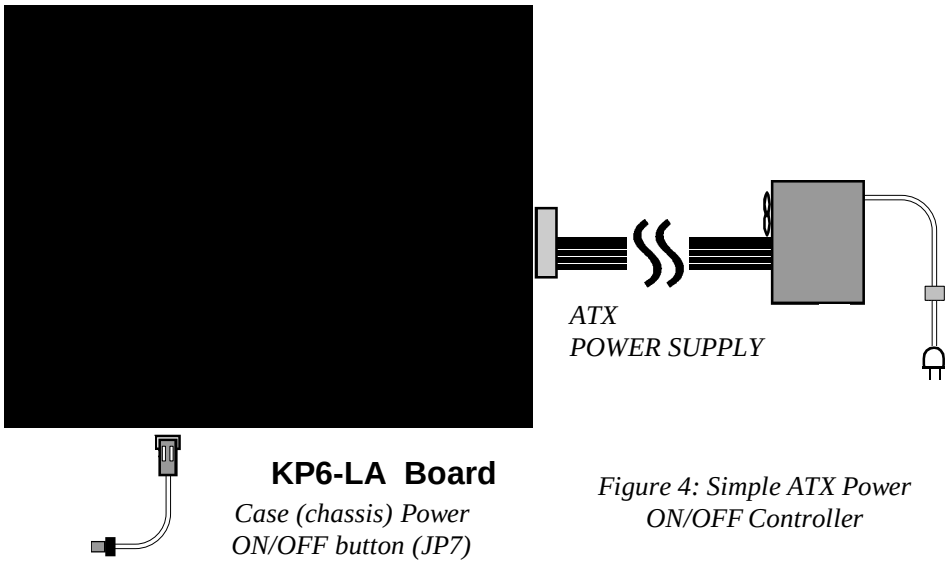


Figure 4: Simple ATX Power ON/OFF Controller

System Block Diagram

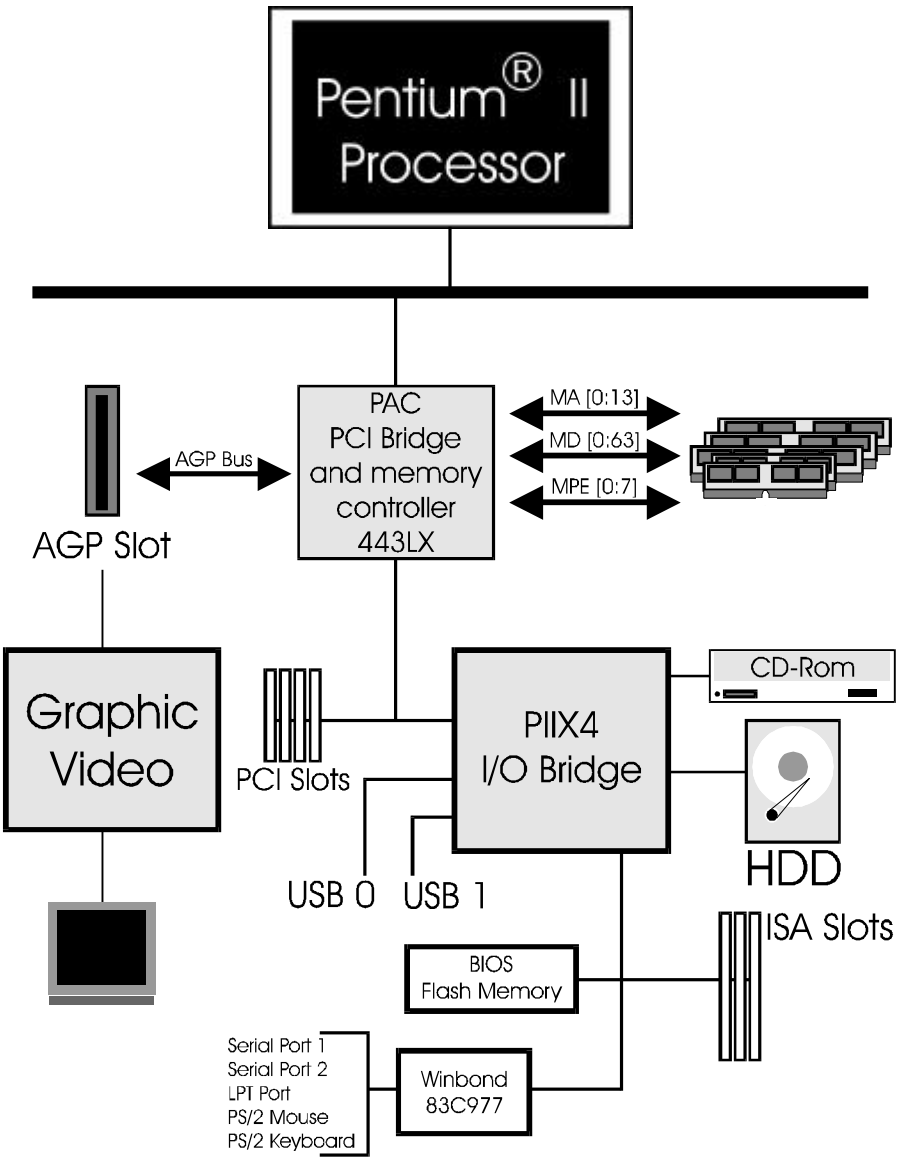


Figure 5: System Block Diagram

Section 2
FEATURES

KP6-LA Features:

- KP6-LA is based on the Pentium® II Processor operating at 233 ~ 330 MHz on Slot 1. The board is configured by an Easy-Setting-Single-Jumper (E.S.S.J.) to match your CPU clock speed.
- Designed with Intel's 82443 LX AGPset.
- Supports up to 1 Gigabyte of DRAM (minimum of 8 MB) on board, You can use either 72-pin SIMM x 4 or 168-pin DIMM x 3 or both. (1 Bank is shared between the SIMM & DIMM) It will automatically detect Extended Data Output (EDO) DRAM or Synchronous DRAM memory (SDRAM) (please see Section 3-2).
- KP6-LA will support Error Checking and Correcting (ECC) when using parity DRAM memory modules. This will detect multiple bit errors and correct 1-bit memory errors.
- Supports (3) 16 bit ISA slots, (4) 32 bit PCI slots, (1) AGP slot and provides (2) independent high performance PCI IDE interfaces capable of supporting PIO Mode 3/4 and Ultra DMA 33 devices. The KP6-LA supports (4) PCI Bus Master slots and a jumperless PCI INT# control scheme which reduces configuration confusion when plugging in PCI card(s).
- Supports ATAPI (e.g. CD-ROM) devices on both Primary and Secondary IDE interfaces.
- Designed with Winbond W83977 Multi I/O: (1) floppy port, (1) parallel port (EPP, ECP), and (2) serial ports (16550 Fast UART).
  Note: Japanese "Floppy 3 mode" is also supported
- Includes a PS/2 mouse connector.
- Allows use of a PS/2 or AT keyboard.
- Features Award Plug & Play BIOS. With Flash Memory you can always upgrade to the current BIOS as they are released. (http://www.epox.com/ please visit our Technical Support section for the latest updates)

- KP6-LA utilizes a Lithium battery which provides environmental protection and longer battery life.
- Supports the Universal Serial Bus (USB) connector. The onboard PIIX4 chip provides the means for connecting PC peripherals such as; keyboards, joysticks, telephones, and modems.
- Built-in ATX 20-pin power supply connector.
- Software power-down when using Windows ® 95.
- Supports ring-in feature (remote power-on through external modem, allows system to be turned on remotely.
- Resume by Alarm - Allows your system to turn on at a preselected time.
- Power Loss Recovery - In the event of a power outtage your system will automatically turn itself back on without user intervention.
- Supports CPU Hardware sleep and SMM (System Management Mode).
- Supports Desktop Management Interface (DMI) facilitating the management of desktop computers, hardware and software components and peripherals, whether they are stand-alone systems or linked into networks. (option)
- Supports LanDesk Client Manager (LDCM). (option)

Section 3
INSTALLATION

Real Picture of Motherboard

KP6-LA Detailed Layout

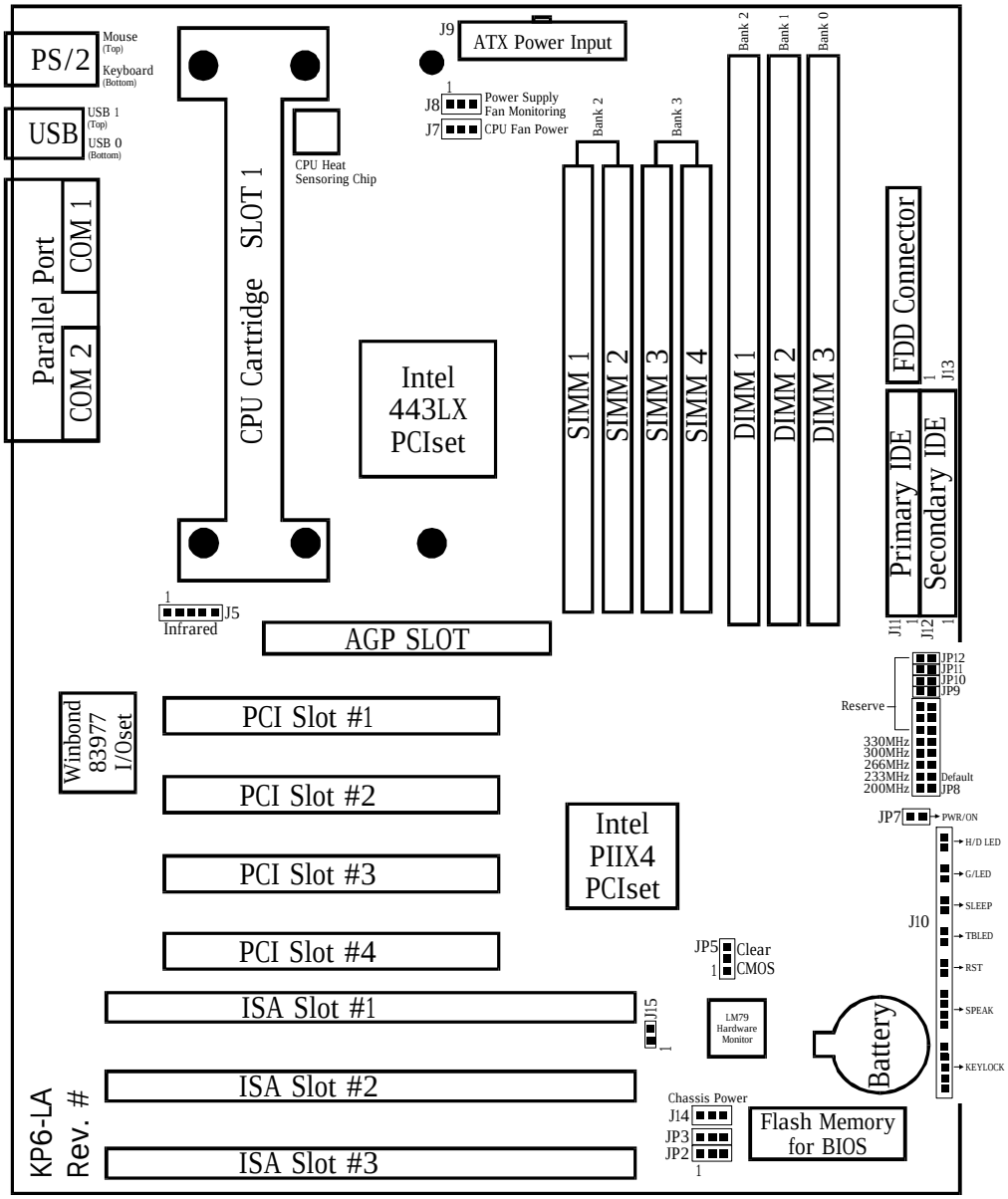


Figure 1

Easy Installation Procedure

Easy Installation Procedure

The following must be completed before powering on your new system:

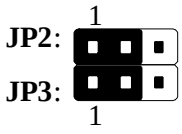
3-1. Configure Jumpers to match your hardware
3-2. Install memory chips
3-3. Install Pentium II Processor
3-4. Device Connectors

Section 3-1
Configure Jumpers

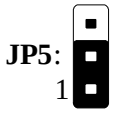
EPoX designs all motherboards with the fewest jumpers to make your install fast and easy.

The following will describe all of the jumpers that you are required to set before moving on to step 3-2.

Note: The jumpers as depicted as shown (Figure 1) in their correct physical orientation.

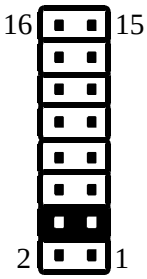


BIOS Voltage Setting
JP2, JP3: = 1-2 - +5V Flash (Default)
= 2-3 - +12V Flash



CMOS Clear
JP5: = 1-2 - Run Mode (Default)
= 2-3 - Clear CMOS

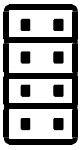
JP8:



CPU Processor Selection

JP8: = 1-2 - 200MHz
= 3-4 - 233MHz (Default)
= 5-6 - 266MHz
= 7-8 - 300MHz
= 9-10 - 330MHz
= 11-12 - Reserved
= 13-14 - Reserved
= 15-16 - Disable E.S.S.J.

JP9:
JP10:
JP11:
JP12:



Reserved CPU Processor Selections

JP9: = Reserved
JP10: = Reserved
JP11: = Reserved
JP12: = Reserved

Section 3-2
System Memory Configuration

Memory Layout

The KP6-LA supports (3) 168-pin DIMMs (Dual In-line Memory Module) and (4) 72-pin SIMMs (Single In-line Memory Module). The DIMMs can be either EDO (Enhanced Data Out) or SDRAM (Synchronized DRAM). The 72-pin SIMMs must be installed in pairs, and DIMMs may be installed using just one chip.

- **We only recommend using SDRAM and not mixing SIMM with DIMM modules.**
- Same size and type EDO memory must be installed in pairs so that memory modules are not mixed in each bank.
- DIMM SDRAM may be 83MHz (12ns), 100MHz (10ns) or 120MHz (8ns) bus speed.
- If you use both 50ns and 60ns memory you must configure your BIOS to read 60ns.
- When using Synchronous DRAM we recommend using the 4 clock variety over the 2 clock.
- **Fast Page Mode DRAM (FPM) is not supported by the LX AGPset. Only EDO and SDRAM are supported.**

Figure 2 and Table 1 show several possible memory configurations using both SIMM and DIMM.

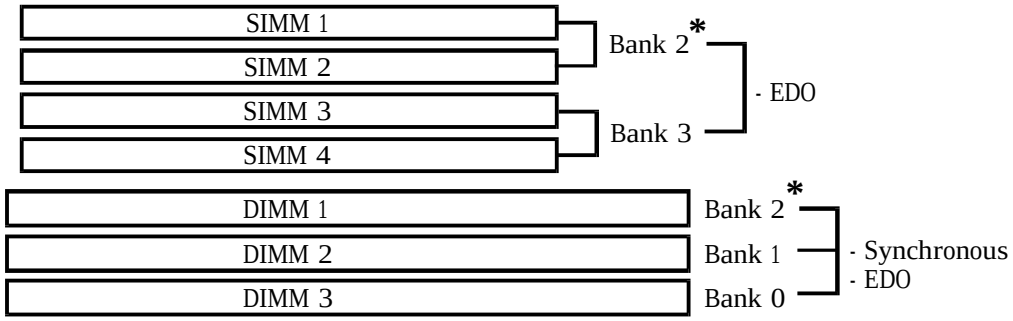


Figure 2

*** Caution: DIMM BANK 2 & SIMM BANK 2 ARE SHARED**
This means that if you use SIMM 1&2 you can not use DIMM 1 or if you use DIMM 1 you can not use SIMM 1&2.

Total Memory	DIMM 3 (Bank 0)	DIMM 2 (Bank 1)	DIMM 1 (Bank 2) Shared	SIMM 3-4 (Bank 3)	SIMM 1-2 (Bank 2) Shared
= 1GB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB 64MB, 128MB, 256M X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	None
= 1GB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB 64MB, 128MB, 256M	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2
= 768MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None
= 768MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	None
= 768MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2
= 512MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None	None
= 512MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	None
= 512MB Maximum	None	None	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2
= 256MB Maximum	None	None	None	EDO 4MB, 8MB, 16MB, 32MB, 64MB, 128MB X 2	None
= 256MB Maximum	EDO/SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None	None	None

** SDRAM only supports 8, 16, 32, 64, 128MB DIMM modules.*

Table 1

SIMM Module Installation

The SIMM memory modules only fit into the sockets one way. There is a notch at one end of the memory that must fit into the SIMM socket.

Memory needs to be placed firmly into the SIMM socket at a 45 degree angle. Then move it to the 90 degree position and make sure that all contacts are aligned. It will then click into place (figure 3).

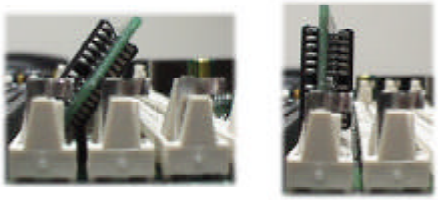


Figure 3

To remove the SIMM module: release the clips on both sides of the SIMM socket (figure 4).

Figure 4

DIMM Module Installation

Figure 5 displays the notch marks and what they should look like on your DIMM memory module.

DIMMs have 168-pins and two notches that will match with the onboard DIMM socket. DIMM modules are installed by placing the chip firmly into the socket at a 90 degree angle and pressing straight down (figure 6) until it fits tightly into the DIMM socket (figure 7).

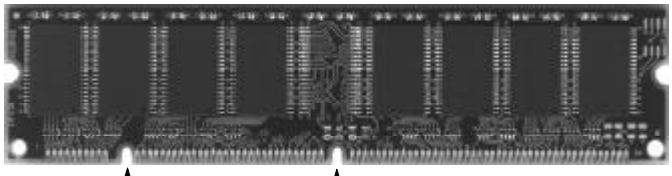


Figure 5

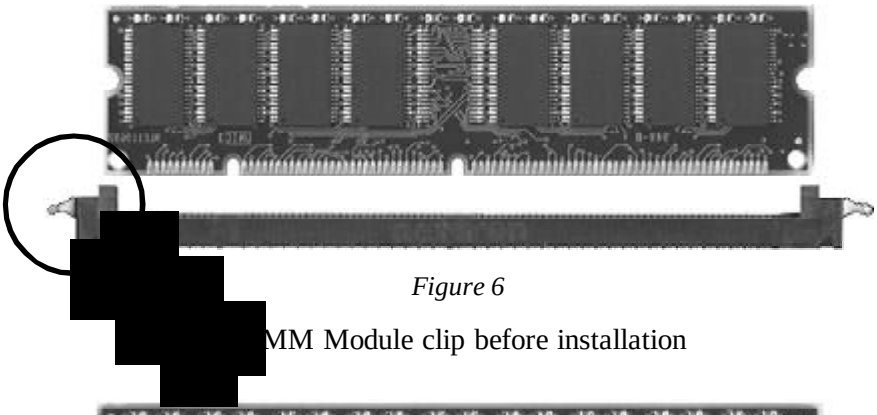


Figure 6

MM Module clip before installation

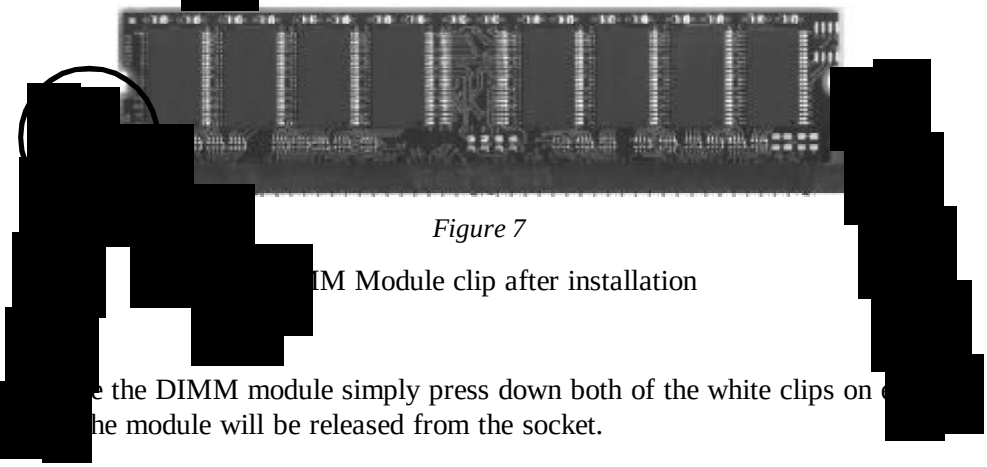


Figure 7

IM Module clip after installation

T e the DIMM module simply press down both of the white clips on
si he module will be released from the socket.

Section 3-3
Installing a Pentium II Processor

The KP6-LA uses the Single Edge Contact (SEC) slot for a Pentium II processor packaged in an SEC cartridge. The SEC slot is not compatible with other non-Pentium II processors.

Please have ready the following list of components so that we may install the processor onto the motherboard.

1. Pentium II retention mechanism with mounts
2. Heat sink support (top/bottom piece)
3. Pentium II processor heat sink
4. Intel Pentium II Processor

OK, now that you have all of your components ready, we can start.

The attach mount bridges (four screws mounted on the motherboard) are pre-installed for easy setup. Place the Pentium II Retention Mechanism over the attach mount bridges. Make sure to line up the notch on the Retention Module (figure 8) with the tab on the Slot 1 Socket.

Figure 8

After placing the retention mechanism over the Slot 1 Socket, use a #2 Phillips head screw driver to tighten the (4) screws. **DUE NOT OVERTIGHTEN THE SCREWS!**

Now we are going to install the heatsink support base piece (figure 9) onto the motherboard. There is both a large and small hole (figure 10) so that the base will only fit in one direction. This piece needs to be pushed into the holes firmly until it is seated.

Figure 9

Figure 9 shows the layout of Slot 1 and the holes for mounting the Heatsink base piece (figure 8).

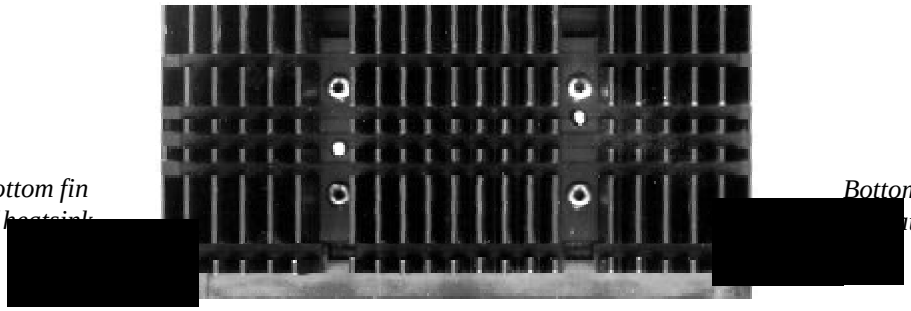
Motherboard Layout

Large Hole for Heat Sink Base *Small Hole for Heat Sink Base*

Figure 10

Now we are ready to install the SEC Cartridge (Pentium II Processor) into the Retention Module. The SEC Cartridge is mounted by sliding the SEC Cartridge into the Retention Module and letting it slide all the way down. Once it reaches the bottom make sure you press firmly on SEC cartridge to firmly secure into the Slot 1 Socket.

Now we need to secure the heatsink with the top half of the support (figure 11). Take the top piece of the support and slide it into the bottom fin (figure 11) on the heatsink and then push forward until it clips into the bottom base (figure 9) that is already there (figure 11).



Bottom fin of heatsink

Bottom fin of heatsink

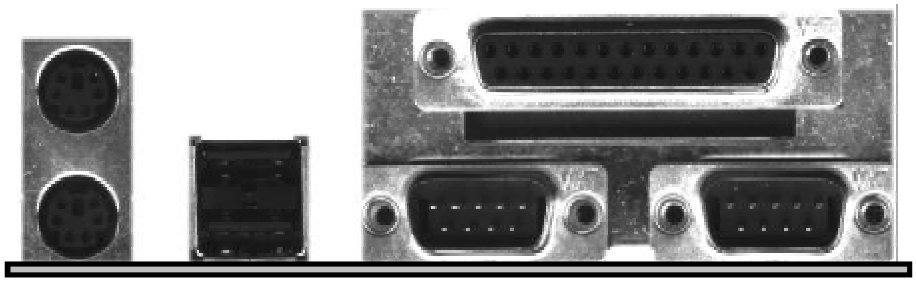
Top half of the support

Figure 11

Section 3-4
Device Connectors

Please install the motherboard into the chassis.

Now that your motherboard is installed you are ready to connect all your connections (figure 12).



PS/2 Mouse (Top)
PS/2 Keyboard (Bottom)

USB 1 (Top)
USB 0 (Bottom)

Parallel Port (Top)

Com1 (Bottom Left)

Com2 (Bottom Right)

Figure 12

J7: CPU Fan Power
- A plug-in for the CPU Fan Power

J8: Power Supply Fan Monitoring
- A plug-in for the Power supply so that BIOS can monitor the RPM's

J9: ATX Power Connector
- 20-pin power connector

J10: Chassis Panel Connector
- Keylock, Speaker, Reset, Turbo, Sleep, G/LED and HDD LED

J11: Primary IDE

J12: Secondary IDE

J13: Floppy Controller

J14: Chassis Fan Power
- A plug-in for the chassis Fan Power

J15: Chassis open monitoring
- A plug-in to monitor the chassis

Section 3-4
Device Connectors (continued)

JP7 **Power On/Off -** This is connected to the power button on the case. Using the Soft-Off by Pwr-BTTN feature, you can choose either Instant Off (turns system off immediatly), or 4 sec delay (you need to hold the button down for 4 seconds before the system turns off). When the system is in 4 sec delay mode, EPoX has added a special feature to make the system go into suspend mode when the button is pressed momentarily.

JP9

IDE LED indicator - LED ON when Onboard PCI IDE Hard disks is activate

Power Saving LED indicator - LED ON when system is in any power saving mode

Sleep/Resume switch : Closed to enter sleep mode, a keystroke or mouse movement will instantly "wake up" the system.

Turbo LED indicator - LED ON when higher speed is selected

Reset - Closed to restart system.

Speaker - Connect to the system's speaker for beeping

1. Speaker 3. GND
2. N/C 4. GND

KeyLock - Keyboard lock switch & Power LED connector

1. Power LED(+) 4. Keylock
2. N/C 5. GND
3. GND

Section 5
DMI ACCESS

DMI Access

DMI, or desktop Management Interface, is a feature that is able to auto-detect and record information about your computer system. This information is used by computing professionals to accurately determine your system configuration and to diagnose and resolve problems.

The computer's BIOS will detect and record as much information as it is able to, and will store that information in a special location in the BIOS.

The DMI configuration utility will allow system integrators to add information that the BIOS cannot detect, such as model and brand of motherboard and other components. This information cannot be detected by the bios and must be added by the system integrator or vendor.

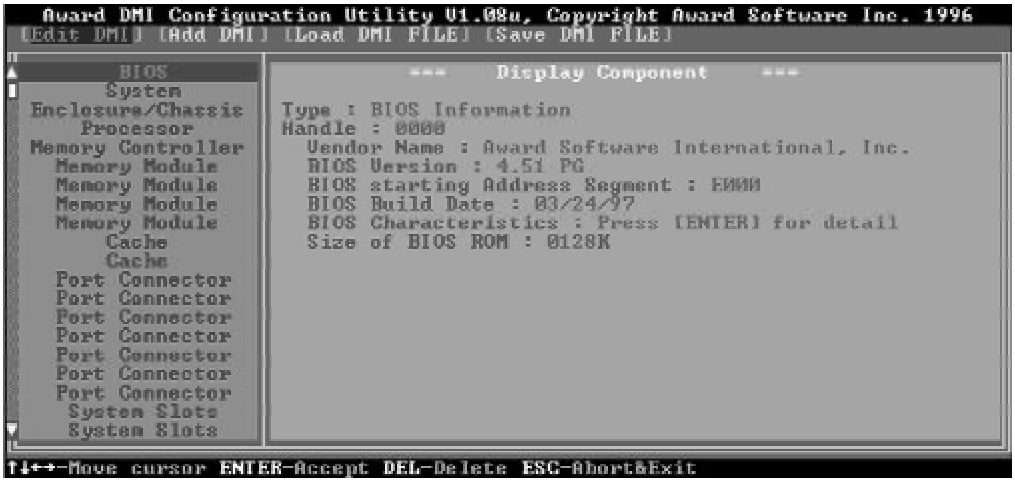


Figure 1: DMI Screen Shoot

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Appendix A:

A-1 MEMORY MAP

Address Range	Size	Description
[00000-7FFFF]	512K	Conventional memory
[80000-9FBFF]	127K	Extended Conventional memory
[9FC00-9FFFF]	1K	Extended BIOS data area if PS/2 mouse is installed
[A0000-C7FFF]	160K	Available for Hi DOS memory
[C8000-DFFFF]	96K	Available for Hi DOS memory and adapter ROMs
[E0000-EEFFF]	60K	Available for UMB
[EF000-EFFFF]	4K	Video service routine for Monochrome & CGA adaptor
[F0000-F7FFF]	32K	BIOS CMOS setup utility
[F8000-FCFFF]	20K	BIOS runtime service routine (2)
[FD000-FDFFF]	4K	Plug and Play ESCD data area
[FE000-FFFFF]	8K	BIOS runtime service routine (1)

A-2 I/O MAP

[000-01F]	DMA controller.(Master)
[020-021]	INTERRUPT CONTROLLER.(Master)
[022-023]	CHIPSET control registers. I/O ports.
[040-05F]	TIMER control registers.
[060-06F]	KEYBOARD interface controller.(8042)
[070-07F]	RTC ports & CMOS I/O ports.
[080-09F]	DMA register.
[0A0-0BF]	INTERRUPT controller.(Slave)
[0C0-0DF]	DMA controller.(Slave)
[0F0-0FF]	MATH COPROCESSOR.
[1F0-1F8]	HARD DISK controller.
[278-27F]	PARALLEL port 2.
[2B0-2DF]	GRAPHICS adapter controller.
[2F8-2FF]	SERIAL port 2.
[360-36F]	NETWORK ports.
[378-37F]	PARALLEL port 1.
[3B0-3BF]	MONOCHROME & PARALLEL port adapter.
[3C0-3CF]	EGA adapter.

[3D0-3DF]	CGA adapter.
[3F0-3F7]	FLOPPY DISK controller.
[3F8-3FF]	SERIAL port 1.

A-3 TIMER & DMA CHANNELS MAP

TIMER MAP:

TIMER Channel 0	System timer interrupt.
TIMER Channel 1	DRAM REFRESH request.
TIMER Channel 2	SPEAKER tone generator.

DMA CHANNELS:

DMA Channel 0	Available.
DMA Channel 1	Onboard ECP (Option).
DMA Channel 2	FLOPPY DISK (SMC CHIP).
DMA Channel 3	Onboard ECP (default).
DMA Channel 4	Cascade for DMA controller 1.
DMA Channel 5	Available.
DMA Channel 6	Available.
DMA Channel 7	Available

A-4 INTERRUPT MAP

NMI :
Parity check error.
IRQ (H/W):

0	System TIMER interrupt from TIMER 0.
1	KEYBOARD output buffer full.
2	Cascade for IRQ 8-15.
3	SERIAL port 2.
4	SERIAL port 1.
5	PARALLEL port 2.
6	FLOPPY DISK (SMC CHIP).
7	PARALLEL port 1.
8	RTC clock.
9	Available.
10	Available.
11	Available.
12	PS/2 Mouse.
13	MATH coprocessor.

14 Onboard HARD DISK (IDE1) channel.
15 Onboard HARD DISK (IDE1) channel.

A-5 RTC & CMOS RAM MAP

RTC & CMOS:
00 Seconds.
01 Second alarm.
02 Minutes.
03 Minutes alarm.
04 Hours.
05 Hours alarm.
06 Day of week.
07 Day of month.
08 Month.
09 Year.
0A Status register A.
0B Status register B.
0C Status register C.
0D Status register D.
0E Diagnostic status byte.
0F Shutdown byte.
10 FLOPPY DISK drive type byte.
11 Reserve.
12 HARD DISK type byte.
13 Reserve.
14 Equipment type.
15 Base memory low byte.
16 Base memory high byte.
17 Extension memory low byte.
18 Extension memory high byte.
19-2d
2E-2F
30 Reserved for extension memory low byte.
31 Reserved for extension memory high byte.
32 DATE CENTURY byte.
33 INFORMATION FLAG.
34-3F Reserve.
40-7F Reserved for CHIPSET SETTING DATA.

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Appendix B:

B-1 POST CODES

ISA POST codes are typically output to I/O port address 80h.

POST (hex)	DESCRIPTION
01-02	Reserved.
C0	Turn off OEM specific cache, shadow.
03	1. Initialize EISA registers (EISA BIOS only). 2. Initialize all the standard devices with default values Standard devices includes. - DMA controller (8237). - Programmable Interrupt Controller (8259). - Programmable Interval Timer (8254). - RTC chip.
04	Reserved
05	1. Keyboard Controller Self-Test.
06	2. Enable Keyboard Interface.
07	Reserved.
08	Verifies CMOS's basic R/W functionality.
C1	Auto-detection of onboard DRAM & Cache.
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster.
08	Test the first 256K DRAM.
09	OEM specific cache initialization. (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers. Initialize INT numbers from 33-120 with Dummy (Spurious) Interrupt Handler. 2. Issue CPUID instruction to identify CPU type. 3. Early Power Management initialization. (OEM specific)
0B	1. Verify the RTC time is valid or not. 2. Detect bad battery. 3. Read CMOS data into BIOS stack area. 4. PnP initializations including. (PnP BIOS only) - Assign CSN to PnP ISA card. - Create resource map from ESCD. 5. Assign IO & Memory for PCI devices. (PCI BIOS only)

0C	Initialization of the BIOS Data Area. (40:ON - 40:FF)
0D	1. Program some of the Chipset's value according to Setup. (Early Setup Value Program) 2. Measure CPU speed for display & decide the system clock speed. 3. Video initialization including Monochrome, CGA, EGA/VGA. If no display device found, the speaker will beep.
0E	1. Test video RAM. (If Monochrome display device found) 2. Show messages including. - Award Logo, Copyright string, BIOS Data code & Part No. - OEM specific sign on messages. - Energy Star Logo. (Green BIOS ONLY) - CPU brand, type & speed. - Test system BIOS checksum. (Non-Compress Version only)
0F	DMA channel 0 test.
10	DMA channel 1 test.
11	DMA page registers test.
12-13	Reserved.
14	Test 8254 Timer 0 Counter 2.
15	Test 8259 interrupt mask bits for channel 1.
16	Test 8259 interrupt mask bits for channel 2.
17	Reserved.
19	Test 8259 functionality.
1A-1D	Reserved.
1E	If EISA NVM checksum is good, execute EISA initialization. (EISA BIOS only)
1F-29	Reserved.
30	Detect Base Memory & Extended Memory Size.
31	1. Test Base Memory from 256K to 640K. 2. Test Extended Memory from 1M to the top of memory.
32	1. Display the Award Plug & Play BIOS Extension message. (PnP BIOS only) 2. Program all onboard super I/O chips (if any) including COM ports, LPT ports, FDD port ... according to setup value.
33-3B	Reserved.
3C	Set flag to allow users to enter CMOS Setup Utility.
3D	1. Initialize Keyboard. 2. Install PS2 mouse.

3E	Try to turn on Level 2 cache. **Note:** Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h.
3F-40	Reserved.
BF	1. Program the rest of the Chipset's value according to Setup. (Later Setup Value Program)
41	2. If auto-configuration is enabled, program the chipset with pre-defined Values.
42	Initialize floppy disk drive controller.
43	Initialize Hard drive controller.
45	If it is a PnP BIOS, initialize serial & parallel ports.
44	Reserved.
45	Initialize math coprocessor.
46-4D	Reserved.
4E	If there is any error detected (such as video, kb...), show all error messages on the screen & wait for user to press <F1> key.
4F	1. If password is needed, ask for password. 2. Clear the Energy Star Logo. (Green BIOS only)
50	Write all CMOS values currently in the BIOS stack area back into the CMOS.
51	Reserved.
52	1. Initialize all ISA ROMs. 2. Later PCI initializations. (PCI BIOS only) - assign IRQ to PCI devices. - initialize all PCI ROMs. 3. PnP Initialzations. (PnP BIOS only) - assign IO, Memory, IRQ & DMA to PnP ISA devices. - initialize all PnP ISA ROMs. 4. Program shadows RAM according to Setup settings. 5. Program parity according to Setup setting. 6. Power Management Initialization. - Enable/Disable global PM. - APM interface initialization.
53	1. If it is NOT a PnP BIOS, initialize serial & parallel ports. 2. Initialize time value in BIOS data area by translate the RTC time value into a timer tick value.
60	Setup Virus Protection. (Boot Sector Protection) functionality according to Setup setting.

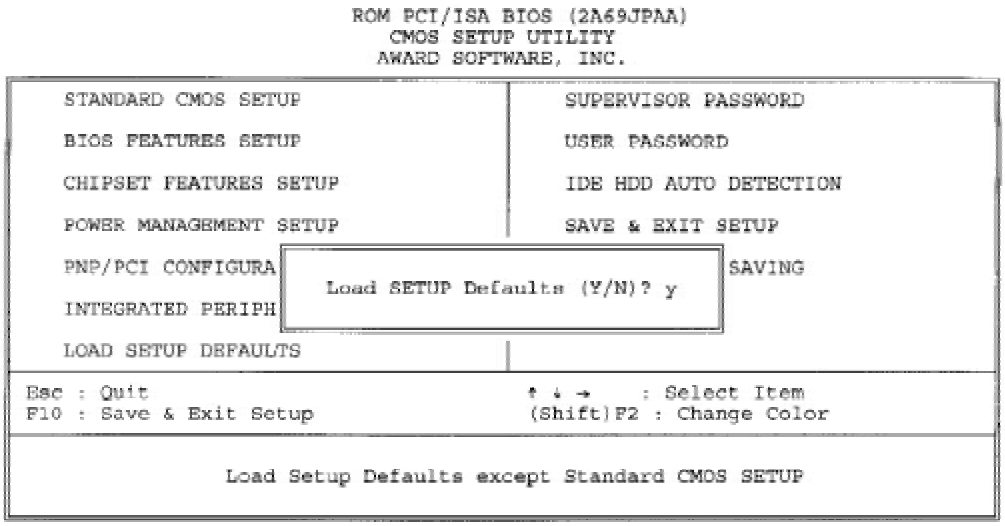
61	1. Try to turn on Level 2 cache. Note: If L2 cache is already turned on in POST 3D, this part will be skipped. 2. Set the boot up speed according to Setup setting. 3. Last chance for Chipset initialization. 4. Last chance for Power Management initialization. (Green BIOS only) 5. Show the system configuration table.
62	1. Setup daylight saving according to Setup value. 2. Program the NUM Lock, typematic rate & typematic speed according to Setup setting.
63	1. If there is any changes in the hardware configuration, update the ESCD information. (PnP BIOS only) 2. Clear memory that have been used. 3. Boot system via INT 19H.
FF	System Booting. This means that the BIOS already pass the control right to the operating system.

B-2 Unexpected Errors:

POST (hex)	DESCRIPTION
B0	If interrupt occurs in protected mode.
B1	Unclaimed NMI occurs.0

Appendix C

NOTE:
The "**LOAD SETUP DEFAULTS**" function loads the system default data directly from ROM and initializes the associated hardware properly. This function will be necessary when you accept this mainboard, or the system CMOS data is corrupted.



LOAD SETUP DEFAULTS